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× A GLASS CONTAINER FOR USE IN STUDYING AEROSOL SOLUTIONS

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The preparation of liquefied-gas aerosols for experimental purposes requires special equipment for the handling of liquids under a gage pressure of 15 to 85 pounds per square inch. It is highly desirable to be able to observe the solution for the presence of insoluble material and for the study of physical and chemical changes in the solution. A number of devices have been described for this purpose, but all have the disadvantage of excessive weight (300-350 grams) of the container in proportion to the weight of the liquid contents (10 grams). A glass container has been developed which weighs approximately 400 grams and has a capacity of 350 grams of the aerosol solution.

The container (fig. 1) was constructed from a strong glass bottle, of the kind commonly used in the drug-store trade for citrate of magnesia, and a refrigeration Y valve (B) with 3/8-inch male and 1/8-inch female outlets. The male connection of the Y valve was machined on a turning lathe to the same shape as the glass stopper furnished with the bottle. The end of the valve, H, was then drilled so that a 1/4-inch (o.d.) stainless steel tube (F) could be soldered into it. It was necessary to notch the Y valve at D to hold the wire loop directly in position over the center of the bottle and to produce an even pressure on the gasket (C). The gaskets were made from 1/8-inch sheets of neoprene or a polyvinyl alcohol resinous material. The neoprene material is suitable for use with the solvents in most of the aerosol formulas, but with the chlorinated solvents it is necessary to use polyvinyl alcohol sheet stock.

For filling the containers with the aerosol solution, two methods are used in the laboratory. The first method is similar to the procedure commonly used in filling the steel containers. The bottle is washed and dried, and the valve assembly is placed in the neck, where it is fastened by a lever (E). A brass flared fitting (1/8-inch IPT to 1/4-inch SAE) is attached to the valve at G. The bottle is then connected to a vacuum pump to permit filling by vacuum. The insecticidal materials are dissolved in the solvents to be used in the aerosol, and the solution is drawn into the bottle through a 1/4-inch copper tube with a 200-mesh screen on the end. The bottle is then connected by means of a refrigeration hose to a supply of Freon-12 (dichlorodifluoromethane) or a mixture of this gas with Freon-11 (trichlorofluoromethane). The tank valve is opened to fill the hose with the liquefied gas. The bottle is weighed, and additional weights equivalent to the amount of the propellent gas to be added are then placed on the balance pan. The Y valve is opened to allow the propellent gas to flow from the reservoir, and closed when the calculated amount has been

added. The tank is disconnected and the flared union is replaced with a nozzle tip (A). The use of electric solenoid valves for filling aerosol containers has been described elsewhere (1).

The second method is used for filling the containers where the final pressure of the liquid is under 50 pounds per square inch. The weighed ingredients are placed in the dried bottle, which is then weighed. The propellent gas is then cooled in a coil of copper tubing packed in dry ice. The cooled liquid is slowly added to the bottle until the desired weight has been reached. The valve assembly is placed in the bottle and fastened with the lever. The filled bottle is then allowed to come to room temperature. It may be necessary to warm the bottle to dissolve the insecticide.

The type of bottle used will withstand safely pressure up to 85 pounds per square inch. The bottles have been tested to 200 pounds per square inch with no failures. At higher pressures the valve-locking device will bend slightly, releasing the pressure within the bottle. As a precautionary measure, a safety glass screen should be used when the filled bottles are being handled on stone-top desks.

Literature Cited

(1) Fulton, R. A., Berlin, F. D., and Bochert, R. S., Jr.
1947. A laboratory method for filling aerosol containers.
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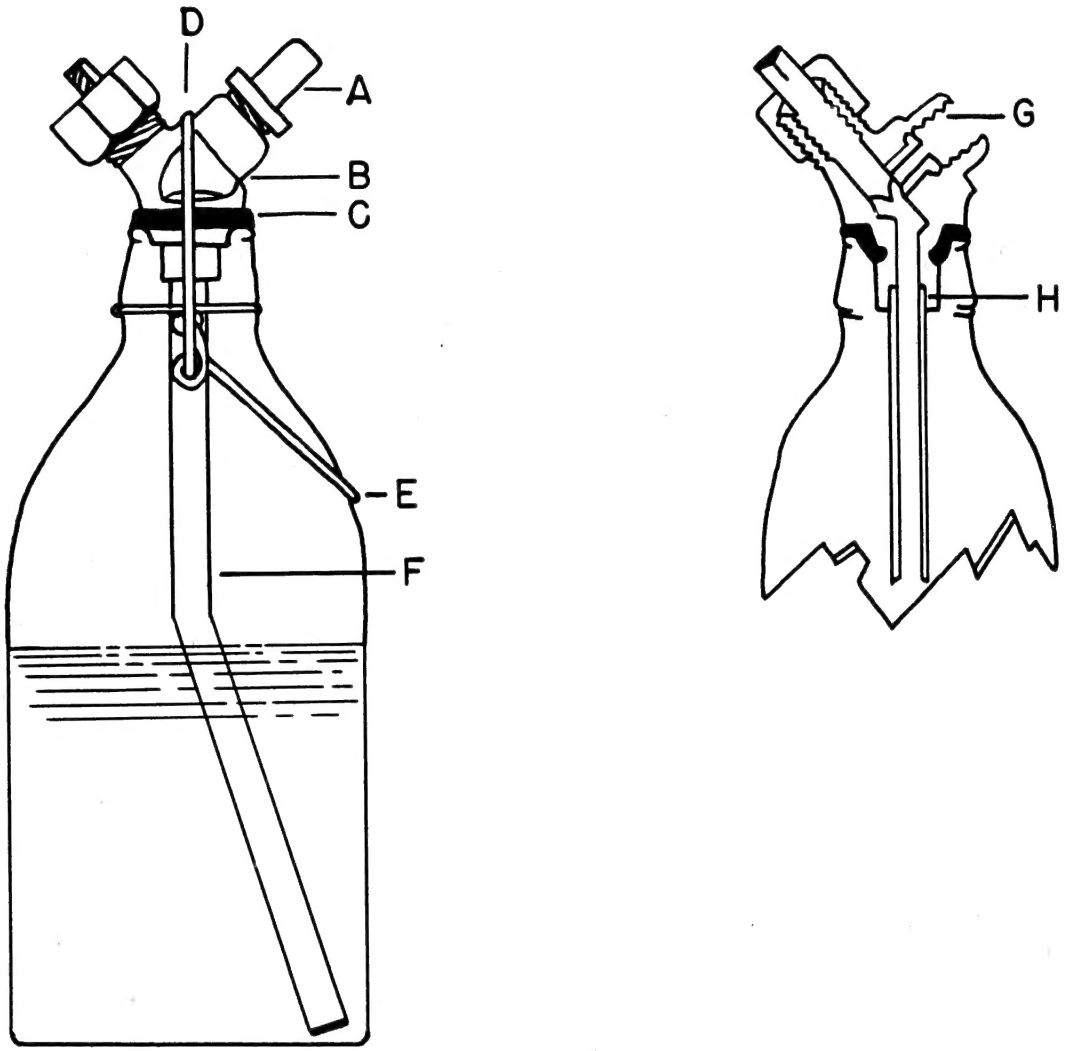

Figure 1.--Diagram of glass aerosol container (left) including detail of Y valve (right).